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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,199	04/25/2001	Winfried Maier	225/49630	3649

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EXAMINER

LE, DAVID D

ART UNIT	PAPER NUMBER
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3681

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

09/763,199

Applicant(s)

MAIER, WINFRIED *ES*

Examiner

David D. Le

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This is the second Office action on the merits of Application No. 09/763,199, filed on 25 April 2001. Claims 12-48 are pending.

#### **Documents**

1. The following documents have been received and filed as part of the patent application:
  - Declaration and Power of Attorney, received on 04/25/01
  - Information Disclosure Statement, received on 04/25/01
  - Priority Document, received on 04/25/01
  - Preliminary Amendment, received on 04/25/01
  - Amendment, received on 01/21/03

#### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:
  - Claim 34, lines 6-7, recites the limitation “a metallic base material”. There is insufficient antecedent basis for this limitation in the specification for claim 34.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 12-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claims 12-48:**

- Claim 12, line 5, recites the limitation “a metallic basic material”.
- Claim 34, lines 6-7, recites the limitation “a metallic base material”.
- Claims 44, line 7, also recites the limitation “a metallic base material”.

It is unclear whether there is any difference between the recited “a metallic basic material” and the recited “a metallic base material”.

It is also unclear on the exact type of material that the applicant is referring to as “a metallic basic material”.

Presently, the specification fails to provide adequate description of either “a metallic basic material” or “a metallic base material”, as recited in the claims.

For the purpose of examining the merits of these claims, Examiner assumes that there is no difference between the recited “a metallic basic material” and the recited “a metallic base material”.

**Claim 13:**

Claim 13 is further indefinite because it recites the limitation " a  $\gamma'$ -connecting layer ". This limitation is first recited in claim 12. Accordingly, it is considered as double inclusions and should be referred to as --said  $\gamma'$ -connecting layer--.

**Claim 14:**

Claim 14 is further indefinite because it recites the limitation " a  $\epsilon$  -connecting layer ". This limitation is also first recited in claim 12. Accordingly, it is considered as double inclusions and should be referred to as --said  $\epsilon$  -connecting layer--.

**Claims 35 and 45:**

Claims 35 and 45 are further indefinite because they recite the limitation " a non-metallic  $\gamma'$ -connecting layers ". This limitation is first recited in claims 34 and 44, respectively. Accordingly, it is considered as double inclusions and should be referred to as --said non-metallic  $\gamma'$ -connecting layers--.

**Claims 36 and 46:**

Claims 35 and 45 are further indefinite because they recite the limitation " a non-metallic  $\epsilon$  -connecting layers ". This limitation is also first recited in claims 34 and 44, respectively. Accordingly, it is considered as double inclusions and should be referred to as --said non-metallic  $\epsilon$  -connecting layers--.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 12-14, 18-23, 30-36, and 40-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,560,461 to Loeffler in view of U. S. Patent No. 4,531,984 to Madsac et al.

**Claims 12-14, 18-23, 30-36, and 40-48:**

Loeffler (i.e., Figs. 1-2, column 3, line 46 – column 5, line 59) discloses a multiple cone synchronizer for use in facilitating gear shifting in vehicle transmission comprising:

- An outer synchronizer ring (60);
- An center synchronizer ring (70);
- An inner synchronizer ring (80); and
- A plurality of friction surfaces (77, 78, 86);
- Wherein each of the synchronizer rings (60, 70, 80) has conical surfaces and they are connected at least indirectly to one another;

Loeffler lacks:

- At least one of the synchronizer rings (60, 70, 80) including a metallic basic material;
- Wherein at least one of the synchronizer rings (60, 70, 80) includes the metallic basic material which is nitride-hardened in such a way that, by process parameters being set during nitride-hardening, one of a non-metallic  $\gamma'$ -connecting layer and a non-metallic  $\epsilon$ -connecting layer is formed on a conical surface of at least one of the synchronizer rings (60, 70, 80);
- Wherein the  $\gamma'$ -connecting layer is formed which includes  $\text{Fe}_4\text{N}$ ;
- Wherein the  $\epsilon$ -connecting layer is formed which includes  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$ ;
- Wherein a nitriding depth is 200 to 800  $\mu\text{m}$ ;
- Wherein the  $\gamma'$ -connecting layer and the  $\epsilon$ -connecting layer are 1 to 20  $\mu\text{m}$  thick;
- Wherein the  $\gamma'$ -connecting layer and the  $\epsilon$ -connecting layer are 10  $\mu\text{m}$ ;
- Wherein the non-metallic  $\epsilon$ -connecting layer of  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$  is formed on said friction surfaces;
- Wherein the non-metallic  $\gamma'$ -connecting layer of  $\text{Fe}_4\text{N}$  is formed on said friction surfaces;
- Wherein the metallic basic material of at least one of the synchronizer rings is a hardenable steel;

Madsac (i.e., column 1, line 10 – column 4, line 40) discloses a surface hardening process for metal parts by nitriding comprising:

- An  $\epsilon$ -connecting layer of  $\text{Fe}_2\text{N}$  or  $\text{Fe}_3\text{N}$  (i.e., column 2, lines 60-68);
- An  $\gamma'$ -connecting layer of  $\text{Fe}_4\text{N}$  (i.e., column 2, lines 60-68);
- Nitriding layer thickness ranging from 250  $\mu\text{m}$  to 500  $\mu\text{m}$  (i.e., column 4, lines 2-40);
- Wherein the  $\epsilon$ -connecting layer and  $\gamma'$ -connecting layer thickness are ranging from 10  $\mu\text{m}$  to 35  $\mu\text{m}$  (i.e., column 4, lines 2-40);
- Wherein the metal part is made of hardenable steel (i.e., column 4, lines 1-6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Loeffler friction surfaces to include the  $\epsilon$  and the  $\gamma'$ -connecting layers such that the nitriding layer thickness would range from 250  $\mu\text{m}$  to 500  $\mu\text{m}$  and the  $\epsilon$ -connecting layer and  $\gamma'$ -connecting layer thickness would range from 10  $\mu\text{m}$  to 35  $\mu\text{m}$  and Loeffler synchronizer rings to be made out of hardenable steel, in view of Madsac, in order to improve the overall fatigue and seizure characteristics of the synchronizer rings as well as to specifically increase the resistance to wear and corrosion of the friction surfaces of the synchronizer rings.

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7. Claims 15-17, 24-29, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeffler in view of Madsac et al. as applied to claims 12-14, 19-23, 32-36, and 41-48 above, and further in view of U. S. Patent No. 6,105,374 to Kamody and U. S. Patent No. 4,618,049 to Pflaum et al.

**Claims 15-17, 24-29, and 37-39:**

Loeffler in view of Madsac discloses all elements and limitations as set forth in claims 19-23, 32-36, and 41-48. Regarding claims 15-18, 24-31, and 37-40, Loeffler lacks:

- Wherein at least one of the synchronizer rings is plasma-nitride-hardened;
- Wherein the metallic basic material of at least one of the synchronizer rings is a sintered material;
- Wherein the metallic basic material of at least one of the synchronizer rings is a sinter-forged material;

Pflaum (i.e., column 4, lines 5-36) discloses a synchronizer ring being made out of materials including sintered steel and sinter-forged material.

Kamody (i.e., column 1, line 60 – column 2, line 29) discloses a process of nitriding metal-containing materials comprising:

- Steel nitriding process;
- Hardenable steel nitriding process; and
- Plasma nitriding process;

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Loeffler synchronizer rings such that the synchronizer rings would be made out of either hardenable steel or plasma or sintered steel or sinter-forged steel, as appropriate, in view of Pflaum and Kamody in order to further improve the overall fatigue and seizure characteristics of the synchronizer rings as well as to specifically increase the resistance to wear and corrosion of the friction surfaces of the synchronizer rings.

#### *Response to Arguments*

8. Applicant's arguments with respect to claims 12-47 have been considered but are moot in view of the new ground(s) of rejection.

#### *Conclusion*

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Anderson et al. (U. S. Patent No. 3,901,740) teaches a method producing nitrided boron steel parts.


Laurence et al. (U. S. Patent No. 5,244,375) teaches plasma ion nitrided stainless steel press plates and application for same.


Japanese Patent (No. JP 61038223 A) teaches a synchronizer ring of a transmission, wherein the synchronizer ring is made of iron, by forging, casting or sintering.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David D. Le whose telephone number is 703-305-3690. The examiner can normally be reached on Mon-Fri (0700-1530).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles A Marmor can be reached on 703-308-0830. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

  
ddl  
May 7, 2003

  
RODNEY H. BONCK  
PRIMARY EXAMINER  
ART UNIT 3681